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Dear Determined Humanitarians,

PHOTO BY JOE TOBIASON

TOP: Damaris Robles (32) and Gualberto García (53) at their home in Sucumbios Province, Ecuador.

For the last couple of years, we have been bringing you stories that demonstrate how we help farming families access formal markets for their products — an approach that expands the traditional interventions we're known for and rapidly improves incomes, shifting project participant farms from subsistence to truly sustainable. And while we work in many and varied markets, we're tackling two especially large players in the global economy: coffee and chocolate.

Though we've been working with coffee farmers for well over a decade, we hadn't fully understood the injustices realized by the small-scale producers of one of the world's most beloved beverages. A trip to Guatemala opened my eyes to this pressing issue. Since 2018, market prices for coffee have stayed mostly under $1 per pound, and low coffee prices, among other factors, make it nearly impossible for farmers to make ends meet. We first wrote about coming to grips with our role in coffee work in the Fall 2019 issue. Now, we're on a campaign to inform others and change the system so that farmers are finally paid fairly. I hope you pay close attention to the infographic in this edition that illustrates the journey coffee goes through from bean to cup. As 2020 progresses, we'll continue pressuring major players in the industry so that change finally comes for farming families who rely on this commodity for their livelihoods.

We're also eyeing other industries where we can have a positive effect for small-scale producers. Much like coffee, chocolate is a product consumers willingly pay handsomely for, while the people who grow it are left with little. Chocolate's origins can be traced back to Mesoamerica, and we are working with growers in the Amazon to improve the quality of their cacao by teaching improved growing practices. The result is tasty chocolate buyers want, which means a large part of our work also concentrates on connecting families to the right markets so their products fetch a fair price. In Ecuador, we're linking small farms to local buyers and partners in the private sector to create new opportunities and inclusive markets that last. That work is detailed here as well.

Our work has always been about connections — whether it be connecting farmers with the right livestock, to each other or, now, to markets that can bring them out of the cycle of poverty. These connections are critical to long-term success. I hope you learn more about these industries in this issue and feel more connected to the people responsible for the products we enjoy on a daily basis.

Yours for a better world,

Pierre U. Ferrari
@HeiferCEO

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OFF THE MENU

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features

COVER: Magola Cecilia Cánticus Pascal, 60, harvests cacao pods in Sucumbios Province, Ecuador.

TOP: Maroon (unripe) and orange/red (ripe) cacao pods in Sucumbios Province, Ecuador.

PHOTOS BY: Joe Tobiason

INSPIRING STORIES
I love the inspiration I get when I open my *World Ark* magazine, and the Holiday issue certainly did that, with smiling wool spinners, a young girl raising money for people she will never meet with her cards and suggestions for real gifts to celebrate the holidays. [There's more] good news in our world as well, with the Global Fund to Fight AIDS, Tuberculosis and Malaria receiving full funding so it can save 16 million lives over the next three years, the Nobel Prize in Economics going to work for ending poverty and more people speaking up to change the world for the better. Thanks for being a partner in this work!

Willie Dickerson
Snohomish, Washington

Thanks for this great article ["Spinning Wool Into Gold"] and its accompanying terrific photography.

I loved learning about what Heifer is doing in Ecuador. It was so interesting to learn about the climate and geography, the people and animals. I really appreciated the comparison of alpacas to llamas, as well as the description of Andean fashion and the journey of alpaca from breeding to finished goods.

I lapped up every sentence and sidebar of this article.

Elizabeth Stevens
Kansas

COWS AND CLIMATE CHANGE
Given mounting evidence of methane produced by cattle contributing to global warming, should we not scale back on donation of cattle for food production?

Lowell Hansen
Lakewood, Colorado

Editor's note: We tackle that very issue in our interview with food systems expert Benjamin Selwyn. See Page 12 for more.

AN ARTIST'S PHILANTHROPY
In our Holiday issue, we wrote about Shea Tomac, a high school student in Corona del Mar, California, who sells handmade greeting cards every year to support Heifer International. In the same article, we shared contact information for anyone interested in purchasing cards, and many of our readers reached out to the Tomacs to do so. Shea's mother, Jill Tomac, sent us a message, updating the progress of Shea's fundraising efforts.

Shea has reached her goal of selling 77 packs of cards to earn $1,950. The donation was made on Giving Tuesday where it was tripled [by a Heifer donor]! She flagged her donation for the women's empowerment program, in which she paid for seven girls to go to school. Since it was tripled, it equated 21 girls to school! She sold 16 packs of cards to people who read your article in *World Ark* magazine! We shipped cards to Texas, Colorado, Vermont, Idaho, Montana, Arkansas and Pennsylvania! She received beautiful letters from those who purchased her cards. One woman is going to frame her cards and put the article on the back of the frame. Another person bought several packs and is going to enclose a picture of her family and give them as gifts encouraging others to donate to Heifer. It was very cool to have these requests come in from your community.

Jill Tomac
Corona del Mar, California

WE WANT TO HEAR FROM YOU!

Please send your comments to **worldark@heifer.org**. Include your name, city, and a telephone number or email address. Letters may be edited for length and clarity, and may be published online as well as in print. Because of the volume of mail we receive, we cannot respond to all letters.

departments

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What's the Real Cost of Your Coffee Habit?

Coffee Addicts

50+% of U.S. adults drink coffee every day

3 cups: amount the average coffee drinker consumes daily

Other countries drink far more: Finns drink the most, **26 pounds** a year

From Bean to Cup

Farmers harvest raw, unroasted beans called cherries.

Middlemen or cooperatives buy the cherries and sell them to processors.

The beans are dried in the sun or fermented, then milled and sorted.

Traders buy the beans and sell them to importers in other countries, who then sell them to roasters.

Roasters turn green coffee into the familiar brown beans.

Roasted coffee is packaged and labeled.

Coffee shops, if they don't roast themselves, buy the roasted coffee and sell it to you.

Coffee Farmers Pay the Price

46-59%

The loss at which average small-scale coffee farmers operate

Less than 1%

What farmers earn from the sale of a cup of coffee at a coffeeshop

2/3

The amount coffee prices have fallen since the 1980s

Less than $1/pound

Average commodity price for coffee since late 2018

At least $3/pound

Minimum roasters and coffeeshops should pay for their coffee to ensure farmers maintain a decent standard of living

Number varies based on geography, family circumstances and other factors

Get Informed

- Ask your barista or email your favorite company to find out how much the people who grow their coffee beans get paid.
- Go to **TransparentTradeCoffee.org** for a list of specialty roasters who voluntarily disclose prices.
- If your preferred brand or shop isn't paying fairly, tell them so and consider shopping elsewhere.
- Be aware that while certification programs often raise the bar in terms of social and environmental standards, that doesn't mean that farmers earn enough.
- Talk about unfair coffee prices with friends and family.
- Share news about the coffee economy on social media, and tag major coffee conglomerates when you do.

Banana Mango Pineapple Pears:

Growing the Legendary North American Pawpaw

By Erik Hoffner, *World Ark* contributor

Pawpaws crept into my garden 10 years ago. Though they looked like normal, nursery-bought tree saplings, in reality they were borne to my New England home on a tide of lore, deep history and culinary curiosity.

I'd first heard of them during one of many stints on organic farms in the Southwest during the 1990s. Weeding our way down a long row of greens, I listened as a co-worker reminisced about college days in Bloomington, Indiana, when, demoralized by dining hall food, he'd visited the little city's fabulous farmers market in search of actual sustenance. There he discovered growers offering baskets of this strange fruit nicknamed the "Indiana banana," and he became hooked on the exotic flavor and consistency.

Later I read about a slew of native North American fruits that long ago evolved to use large fruit-eating mammals to spread their enormous seeds. Animals like mastodons and giant ground sloths, which devoured the sweet produce of trees including the pawpaw, the continent's largest native fruit, dispersed the seeds across the landscape in their rich dung, which helped the plants to sprout.

Following their partners' extinction, pawpaws have since relied on humans to move across the landscape, first with native people who planted them along trade routes to cultivate places to snack while traveling, and much later with the aid of farmers and gardeners.

All this had gotten me really curious to taste one of these legendary fruits, which many describe as a cross between a banana and mango, despite others who insist there's more pear or even pineapple flavor than mango in their flesh.

However, I was defied by the landscape itself. Pawpaws tend to grow from the Gulf Coast Plain to the Lower Midwest and Mid-Atlantic states. I had since moved to New England, an area where the exotic-looking trees are rare but will grow and survive winter temperatures as low as minus 25. In fact, their seeds actually require a period of freezing ("scarification") before they will germinate.

But due to a near complete lack of availability, pawpaws approach mythical status here. New England does have one well-established fruit farm on the Rhode Island coast that sells them reliably each fall, and pawpaw devotees do often drive from as far away as Pennsylvania – a four-hour drive one way, at minimum – to wait in line before the farm stand opens on the few days each year that it offers the fresh ones for sale. That farm's proprietor reports that the ripe fruit is normally gone within minutes.

One other major obstacle to greater pawpaw distribution

PHOTOS FROM BIGSTOCK.COM

is their notoriously short shelf life of just a few days: once they are ripe you must eat them fresh (with a spoon, as many folks prefer) or scoop out and freeze the flesh for subsequent mixing into ice cream, smoothies or more elaborate dishes. There are a number of farms that have dabbled with shipping them overnight to paying customers, and while some still do, the results can be mixed, with fruit arriving in various states of edibility (the Rhode Island farm ended this practice years ago now), and the cost was prohibitive for this writer's salary.

I realized I'd have to grow my own if I wanted to be certain about tasting one of these oblong beauties, and it was a shock when I started looking to mail order some young trees and saw pawpaws offered in the plant list of a nursery near me. I visited the operation and was surprised to see among the hardy kiwi, persimmons and clumping bamboo varieties a stand of pawpaws about 20 feet tall and nearly as wide, their lush leaves enjoying the strong spring sunshine.

The proprietor grows saplings from seeds collected from fallen fruits and claimed they were a popular item, though not with him, since he's part of the small slice of the population that's allergic. I walked out with three one-foot-tall saplings, since two or more trees of the same variety grown from seed (or two or more varieties from grafted trees) are required for proper pollination. Though pawpaws are adapted to life in the shade of established tree canopies, they prefer full sun, so I made plans for them on the sunny south slope below the house.

After planting the trees, I settled in to wait four to six years for their first flowers, and, hopefully, fruit. Pawpaws flower late in spring, meaning they are less likely than apples, pears

and peaches to be killed by late frosts. Flower they eventually did, at year eight: beautiful, deep red and slightly meat-scented, their petals designed to attract pollinating flies.

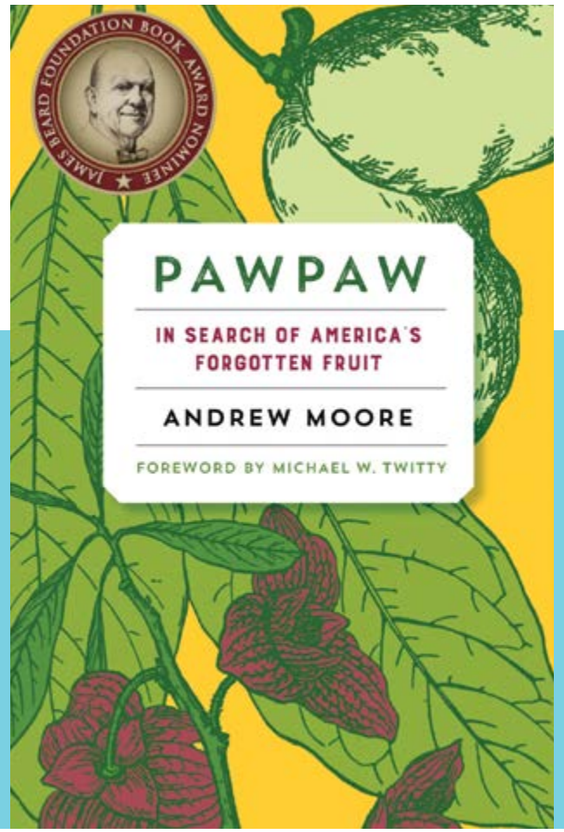
No fruit was set that year though, so I searched websites for the reasons for possible failure and read that you could hand-pollinate them by swizzling a paintbrush in the flowers to spread pollen and increase the odds. Some folks even drape the branches with raw bacon to bring in more flies, though that increases your chances for broken branches from hungry raccoons and bears. I gambled and did that, but no fruit appeared. When the trees flowered the following year, I even placed a roadkill porcupine under their boughs to attract a fly swarm in addition to the paintbrush routine, but still I got no fruit.

In 2019, I resolved to not go crazy and just pollinated the lower flowers I could reach. I was delighted when several clumps of fruit formed, many of them above the reach of my brush, so the flies had done their job admirably, without me. (I later read that pawpaws may flower for a couple years before they decide they're actually ready to set fruit.)

I watched the fruit swell all year with anticipation, but my wait to sample their flesh had actually come to an end the previous fall, when I discovered a generous friend of a friend living just 20 minutes away who had begun his own pawpaw experiment years before mine and had sacks of them to share.

Those first bites lit my mind on fire. They absolutely did taste like a marriage of banana and mango, but I couldn't quite square these exotic flavors with the autumn landscape I saw them spring from. I was hooked.

Call them Hoosier bananas, American custard apples, banangos or whatever you like. Eat them fresh or blend them into baked goods or ice cream (and even jam or beer), and I promise that you will find their flavor to be as unique as their story. ■



FURTHER READING

If you would like to learn more about the wild-growing, tropical-flavored fruit that's native to the United States, check out Andrew Moore's ***Pawpaw: In Search of America's Forgotten Fruit.*** Moore's book uncovers the storied history, lore and culture of pawpaws, including the fact that they saved the Lewis and Clark expedition. But mostly it's a fun travelogue that visits the core regions where pawpaws grow both wild and with the support of humans.

Will Vegans Save the Planet?

Interview by Molly Mitchell, *World Ark* writer

As the climate crisis intensifies, we're all wondering what we can do to heal the planet. Large-scale industrial meat farming is a major contributor to the greenhouse gas emissions that fuel climate change, so naturally an en masse switch to veganism would solve the problem. Or would it?

Benjamin Selwyn is a professor of international development at the University of Sussex in Brighton, England. An expert in food systems, Selwyn cautions that veganism may not be the cure-all we're looking for.

WORLD ARK: We are hearing a lot about people choosing to forgo not only meat, but also dairy, eggs and all animal-based foods. Is veganism growing in popularity?

BENJAMIN SELWYN:
Veganism is on the rise big-time in the United Kingdom and the United States. In the U.K., the number of vegans has increased from around half a million in 2016 to more than 3.5 million today. In the U.S., approximately 2.5 percent of the population is vegan.

What makes people decide to go vegan?
There are three interlinked arguments for veganism. One of them is from an animal rights perspective, which draws on arguments about "speciesism" developed in Peter Singer's highly influential book, *Animal Liberation*. Singer argued that nonhuman animals are intelligent and feel emotions and pain. Human animals do not uniquely possess these abilities and feelings. Of course, once we recognize that animals possess intelligence and emotions and feel pain, then it becomes much more difficult to justify our maltreatment of them on the basis that they are "dumb beasts." One way that Singer explains this is to ask us to consider how we'd feel if our household pets were treated in the same way as intensively reared cattle. Many of us would be shocked, and the conclusion we should reach, according to Singer, is that such treatment of any animal is unethical.

Another argument for veganism is that it can be

TOP
Benjamin Selwyn, food systems expert and professor of international development at the University of Sussex. Photo

I'm quite critical of the idea that by simply giving up animal products people will be saving the planet.

more healthy than diets that include animal products.

A third argument is that turning to veganism would cut demand for meat, in particular beef, and that such reductions in demand would contribute to saving the world's environment. This is because meat production, according to this view, causes all kinds of environmental damage – from cutting down forests for pastureland to the greenhouse gas emissions from cattle.

If everyone in the world were to go vegan tomorrow, would it stop climate change?

The global livestock sector, and especially industrial-scale beef production, has a particularly severe impact on climate change: 33 percent of global croplands are devoted to feed crops, and 26 percent of the world's ice-free land is used for livestock grazing. Livestock generates around 7 percent of total greenhouse gas emissions. Quite clearly, something needs to be done about these negative impacts on climate change.

But eliminating meat production in and of itself would not stop climate change. Beyond global livestock production, the global agroindustrial system generates between 20 to 35 percent of anthropogenic greenhouse gases.

Many vegans rely on meat substitutes such as soy for protein. And mass soy production in places like Argentina and southern Brazil is ruinous for the environment in various ways. It is responsible for widespread deforestation. It relies heavily on pesticide, fertilizer, fungicide and herbicide applications that damage local soil and water systems and native plant species.

And we should not lose sight of the $4.65 trillion fossil fuel industry – the 1,500 oil and gas firms listed on stock exchanges across the globe – that have quite literally fueled the climate disaster.

Stopping climate change requires much more than giving up meat. It means shifting our economic system away from fossil fuels, radically cutting the amount of goods that are produced globally, making mega investments in renewable energy, and finding new ways of organizing our living and working habits.

I believe that in addition to these shifts, we need to make the world a more equal place, where every single person can lead a good life. This would require widespread redistribution of economic and political power. If we abandon this idea of equity in the face of the climate crisis, we risk opening the door to extremely authoritarian solutions to the crisis, which would represent a civilizational reversal on an unprecedented scale.

What are the upsides and downsides to veganism?

Upsides could include a more healthy diet if the shift away from animal products is undertaken carefully.

It should be obvious by now that I'm quite critical of the idea that by simply giving up animal products people will be saving the planet. Having said that, I'm very enthusiastic about the motivation driving more and more people to question what and how they consume.

As far as I'm concerned, the rising popularity of veganism is part and parcel of rising awareness about the dangers of climate breakdown and the ways that our growth-based economic system has contributed to this situation. For me, the rise in veganism signifies a determination amongst more and more people to create a better, fairer, genuinely environmentally sustainable world.

In terms of downsides, shifting away from animal products without properly understanding our bodies' nutritional requirements represents a risk. Some research suggests that vegan diets could actually be contributing to increased malnutrition in developed countries.

Veganism is well-known and understood in the United States. Is that the case everywhere?

The modern variant of veganism that we are familiar with, popularized in the mainstream media, is reasonably well understood in the U.K., Australia, New Zealand and across parts of Europe. These are regions where intensive cattle rearing generates numerous horror stories – about animal welfare, environmental breakdown and problems of obesity.

But in many parts of the Global South, the situation is quite different. It is important to remember that around 1.3 billion people are small-scale farmers and livestock keepers for whom animal products are essential, and for whom there

PHOTO FROM BIGSTOCK.COM

BOTTOM Selwyn urges us not to forget about the massive impact the use of fossil fuels has on the environment.

PHOTO BY PHILLIP DAVIS

TOP Eliza Lubinza searches for water in Igunga, Tanzania, where climate change is causing severe drought.

PHOTO BY RUSSELL POWELL

TOP
Jeremy Muthoka, 5, (left) pours his sister Cobby Cornelius, 4, a glass of milk in Kasalani, Kenya.

Consumer choice is one thing if you have plenty of disposable income. It is something quite different if you live in poverty.

are precious few alternative livelihood strategies on offer.

Are there places where going vegan simply isn't an option?
One of the big problems following the global financial and economic crisis in 2008 is of changing food consumption trends. My colleagues at the Institute of Development Studies at Sussex studied changing food consumption habits in 10 countries following the crisis. They found that a coping strategy for poorer people was to reduce their food expenditure and the time spent preparing and consuming food. This was so that, as a consequence of increasingly precarious and low-pay jobs, they could undertake more work. My colleagues found that one of the ways they did this was to reorient their diets toward "filling foods, sacrificing safety, taste and familiarity for volume and price."

In many contexts around the world, where securing and consuming food is part of a survival strategy, appeals for a shift to veganism won't get much of a hearing. What would be popular would be arguments about making high quality, nutritious, environmentally sustainable food a public good. At the moment in many countries, education and some degree of health provision are considered public goods to be provided by the state to citizens. There is no reason why food could not become increasingly integrated into such systems.

Can you talk about the cultural and socioeconomic privilege inherent in even having the choice to be vegan?
As far as I'm concerned there is an element of socioeconomic privilege inherent in the idea that by changing our individual diets, we can change the world. Consumer choice is one thing if you have plenty of disposable income. It is something quite different if you live in poverty.

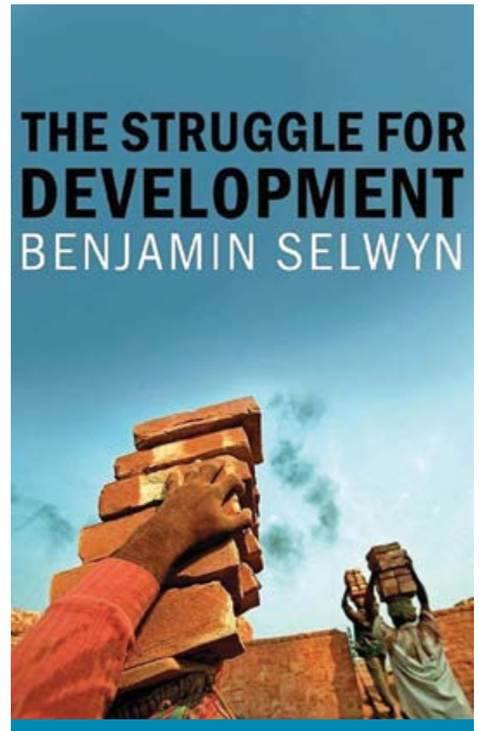
Is there a less dramatic but still impactful way to change our diets in order to be more planet-friendly?
We need to think about public procurement. Together, public universities, schools, hospitals and prisons constitute a significant locus of demand in our economies. At present many of these institutions are locked into deals with private food-provision companies. These deals are often based on the idea of "value for money" (i.e. as low cost as possible) procurement by the institutions and a profit-first mentality by providers. Often the consequences are that the foods provided in these institutions are low quality and contribute to public health issues such as obesity and hidden malnutrition.

How about reworking these systems of provision and consumption so that they combine the provision of high quality, locally produced food to consumers, with livelihood sustaining prices for consumers? Of course, some people might ask, "Who'll pay for all of this?" The global fossil fuel industry receives huge subsidies, around 6.5 percent of global GDP. If we could find a way to instead aim these subsidies toward activities that actually made people's lives better, then we'd be on the right track!

What does your own diet look like?
[laughs] That's a good question. Since I started teaching a course on The Global Politics of Food at the University of Sussex last year, I began thinking a lot more about food production and consumption. Now I consider myself to be a flexitarian. Having said that, my wife is Italian, and we spend most summers in Italy, which makes it impossible to get away from amazing food, meats and cheeses in particular.

If going vegan won't save the planet, what should we focus on instead?
I'm hopeful that a Green New Deal will emerge. At the heart of the Green New Deal is a commitment to decarbonize the economy and combat poverty, inequality and all forms of discrimination. In terms of agriculture, this could mean implementing land reform (to make land more accessible to the mass of the population), reorienting subsidies to support nutritious and environmentally sustainable food production, and increasing the power of consumers collectively to determine how food is produced.

Ultimately, however, we need to think about the overarching economic system. Capitalism is very creative, in terms of technological innovations and economic growth. But it is also very destructive, in particular in terms of the environmental costs of economic growth, and the way it concentrates wealth and resources in the hands of a tiny minority while leaving the mass of the world's population with relatively little. We need to think about economic systems where wealth and power are more equitably distributed. ■



Benjamin Selwyn teaches a course called The Global Politics of Food. His most recent book is *The Struggle for Development*.

Bittersweet HARVEST

BY **MOLLY MITCHELL,** *WORLD ARK* WRITER
PHOTOS BY **JOE TOBIASON**

The world is in love with Amazonian chocolate. Heifer Ecuador is making sure chocolate loves its farmers back.

SHUSHUFINDI, Ecuador — It's harvest time in the family chocolate grove. Young trees burst with full greenery, and cacao pods hang all over them in warm shades from sunset golden and orange to deep red, like Valentine hearts. Farmer Digna Magdelena Silva Narváez surveys her success proudly, with her husband and two daughters looking on.

This sweet picture of family togetherness was hard-won. Silva grew up in the countryside, which for her is the Amazon rainforest. She treasured her childhood on the family farm in Shushufindi, Ecuador, which she blames particularly on her father, with whom she is very close. "It's his fault that I love the farm," she laughs. When she tried to make a go of it in the city with her husband and a young daughter, they were unhappy.

LEFT
A family portrait of Angie Paula Andrade Silva (13), Digna Magdelena Silva Narváez (31), Roberth Hernán Andrade Álvarez (43) and Lina Jared Andrade Silva (2).

RIGHT
Digna Magdelena Silva Narváez harvests maroon (unripe) and orange (ripe) cacao pods hanging off the tree.

"We're together. The family's together."

— Digna Magdelena Silva Narváez

"We were living in town for six years, and that was very hard for all of us because I couldn't be with my daughter," said Silva. "I had to get out of the house at 6 in the morning, and I left her with my sister-in-law. And I got home at 7 at night, and she was already asleep. So, I only saw her when she was asleep. Now, I have my little girl, and she can be with me in the field. She gets dirty but nothing else bad happens," Silva laughed. "We're together. The family's together."

Silva and her husband, Roberth Andrade, now have two daughters, Angie Paula Andrade Silva, 13, and Lina Jared Andrade Silva, 2.

Moving back to the farm had its own difficulties, namely, how to make a living. "When we came here, it was hard because we purchased this [land] by taking a loan," said Roberth Andrade. "So, we were working on borrowed money, and the worst thing was that there wasn't employment anywhere."

Things turned around when the family tried their hand at cacao. "This [cacao] has helped us a lot," Silva said. "It's just one little hectare [about 2.5 acres] there, but that has provided enough for our own food." Silva and Andrade planted a varietal

of cacao they call "supertree." They and many other growers are hoping this particular cacao tree can help solve some of the serious issues in the world trade of chocolate.

There are three genetic lines of cacao tree dominant in Ecuador. One, fine aroma cacao or Criollo, produces the best, most complex flavors. But these trees are delicate and difficult to grow, unsuited to the moisture of the Ecuadorian Amazon and therefore grown almost exclusively on the coast. The most common variety of cacao is overwhelmingly Forastero, which constitutes at least 80 percent of world production. It's the heartiest and easiest variety to grow, but its flavor is not so great. Big candy companies buy this kind in bulk, and make up for the lacking flavor by mixing in lots of milk, sugar and other ingredients in the candy. West Africa is the greatest supplier of this echelon of chocolate, and in fact produces two-thirds of the world's chocolate.

TOP
Digna Magdelena Silva Narváez cuts ripe cacao pods.

BOTTOM
Lina Jared Andrade Silva pulls cacao seeds and separates them into a bucket.

So, where does that leave families like Silva's and their *chocolatales* (chocolate forests)? After all, after much debate, recent genetic testing has revealed that Amazonia is the birthplace of cacao. This is where Trinitario, or supertrees, might save the day. These are types of hybrids between Forastero and Criollo, hardier than their fancy Criollo relative but still imbued with the complex bouquet and adventurous

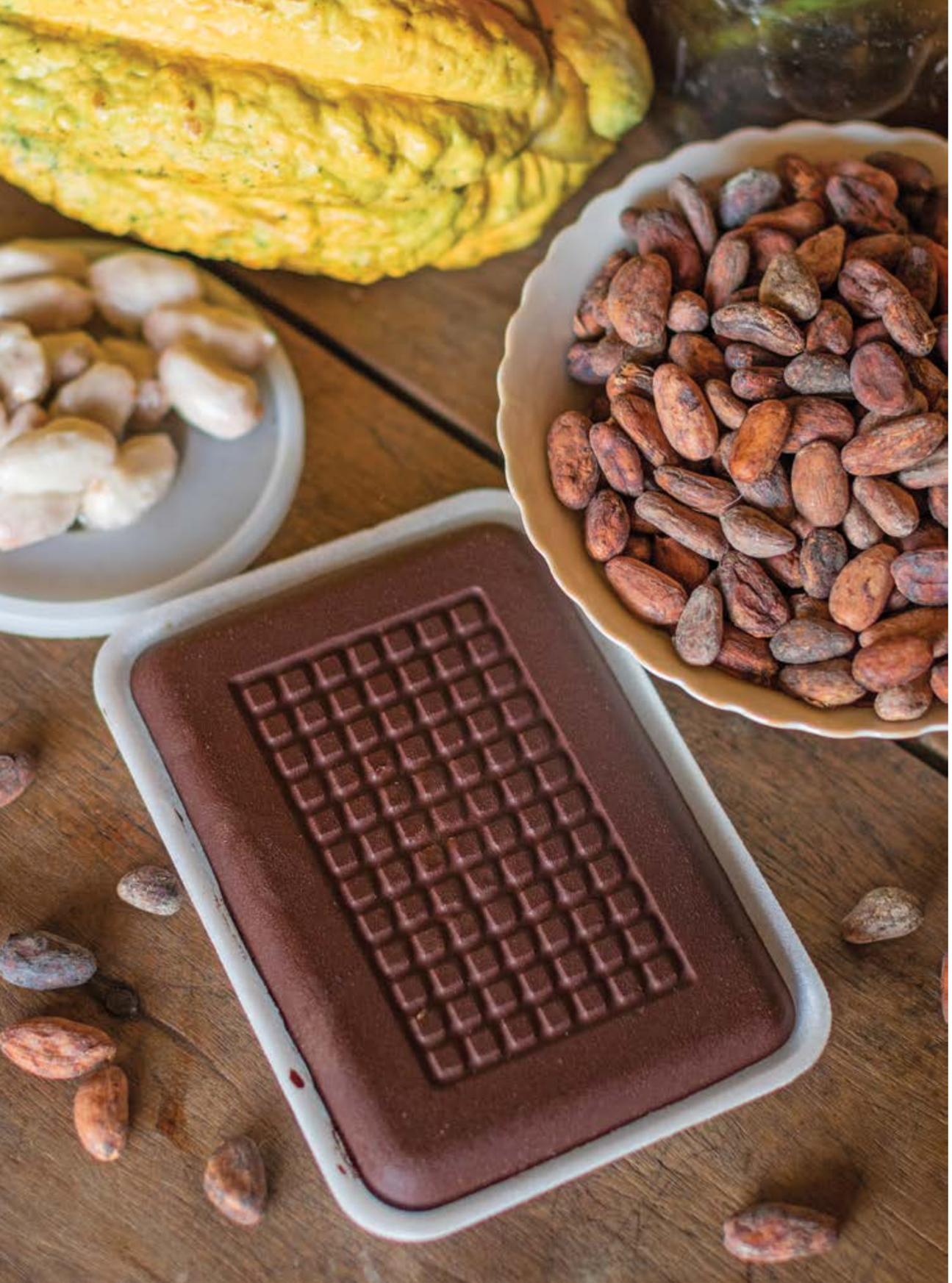
FOOD *of the Gods*

Chocolate, both the food and the word, originate in Mesoamerica, and people loved it then, too. It was considered valuable enough that in some ancient civilizations, cacao beans were used as currency. According to some ancient Aztec documents, you could trade one bean for a tamale or pony up 100 beans for a turkey. Aztec emperor Moctezuma is said to have consumed 50 cups of drinking chocolate daily.

COURTESY OF THE BRITISH MUSEUM

Ancient Latin Americans didn't eat chocolate as a sweet treat like we do now, rather they prepared it as a dark, bitter drink more akin to black coffee than our cheerful hot chocolate concoctions of today. Still, it was considered a mood-lifter, even carrying divine significance. So much so that before Aztec human sacrifices, victims would sometimes be given gourds of chocolate, which contains chemicals that make people feel good, to raise their spirits enough so that they would participate in the ritual dancing before their deaths. The scientific name of the cacao tree, Theobroma cacao, means "food of the gods" to reflect this history.

Europeans initially weren't as enamored with chocolate. When Spanish conquistadors landed in Latin America, they were introduced to chocolate. Hernán Cortés wrote it was "a bitter drink for pigs." But eventually, chocolate was brought back to Europe, where sweeteners like honey and cane sugar became a common ingredient in the drink for the first time. The transformation of chocolate from bitter to bittersweet made the whole world fall in love. And the rest is history.



LEFT
The stages of cacao, from pods to seeds to roasted beans to bars.

RIGHT TOP
Roberth Hernán Andrade Álvarez and Digna Magdelena Silva Narváez lay their fishing nets.

BOTTOM
Digna Magdelena Silva Narváez laughs while holding one of her pigs.

flavor characteristic of Latin American cacao.

Much like wine, quality chocolate has a potent orchestra of flavorful notes all its own, from smoky undertones, floral notes or punches of citrus. When native Latin American chocolate is allowed to grow among the other tropical flora natural to its habitat, the chocolate inside absorbs the heady aroma and exotic tastes of the forest around it.

But as the rest of the world is rediscovering the divine taste of Latin American chocolate, the majority of cacao farmers in the world continue to live in poverty. Much like the coffee industry, the high prices consumers pay for the end product get lost in the mix and very little makes it to the people who actually grow it.

It's a far cry from the origins of chocolate in Mesoamerica, when the value of cacao was so well appreciated that the beans were used as currency by both the Mayan and Aztec empires. Heifer is working with families like Silva's to get better prices for their cacao by improving the quality of tree, teaching organic growing practices and connecting them to the right markets for their wares.

But growing cacao, of course, takes time. Families in an immediate crisis of poverty now need a stopgap between their long-term business plan with chocolate and their urgent needs. That's why part of the Heifer project is helping participants diversify their farming businesses into raising fish and pigs, which are good extra income and perfect for immediate emergency funds.

FISH FEED *Families*

Raising premium cacao takes time, and families living in poverty right now need immediate income to provide food, education and medical care for their families. Fish farming can be a great solution for diversifying a farmer's portfolio. Fish have a good "feed-to-flesh ratio," meaning that it's profitable to buy fingerlings and spend money to fatten them up for sale.

"The first time we stocked the fingerlings, we didn't even know how to fish," laughed Roberth Andrade. "The first time, we only caught a couple of fish. The second time we went through with the net, we doubled our yield with four fish. So, we went to see a neighbor and we learned properly."

Now, Andrade and Digna Silva sell a batch of 200 to 300 pounds of fish every five months, and they can fish their ponds for their personal diets any time they want. The couple does the work to get the most out of their fish — they clean the fish before selling for a higher price, and they can make collagen out of the fish scales, which they sell as refrigerated gelatin. And since the family got their fishpond, they get to eat grilled fish whenever they want. Their local style of preparation is unique and delicious, and we were lucky enough to get a demonstration.

Roberth Andrade and Digna Silva harvest by net fishing. Their fishing net has weights on the bottom and floats on the top. They dredge the pond to get the fish.

Silva and Andrade raise tilapia and a type of native fish called macachama.

They grill their fish whole, wrapped up in banana leaves. The leaves don't burn away on the grill, rather they keep the fish inside from drying out as they cook. Unlike with tin foil, there's no uncompostable trash leftover from cooking.

The fish is flavored with a native type of cilantro and wrapped in the banana leaf. The banana leaf is tied by taking the spine of the leaf and pulling tendrils from it like string cheese. These tendrils can be used just like string to tie the leaf securely around the fish.

Fish grill on the coals of an outside firepit until they smell irresistible and the fish has turned opaque. All the effort is worth it – breathing in the tropical aromatic steam as you unwrap your banana leaf to reveal the meal inside is an unforgettable way to start a meal.

LEFT
Digna Magdelena Silva Narváez, Lina Jared Andrade Silva and Angie Paula Andrade Silva hang out.

RIGHT
Digna Magdelena Silva Narváez smiles with an open cacao pod.

“It’s beautiful. Because not everyone has that good fortune. Because they have to go away for work. They have to be separated. But we’re together.”

— Digna Magdelena Silva Narváez

On the chocolate side of things, cacao-growing families are now selling to local farmers markets and fairs and also to larger local players like Ecokakao. As the name suggests, Ecokakao is a company driven by sustainability, and the organic and sustainable practices Heifer project participants use to grow their cacao makes them a perfect partner.

To that end, Silva’s group developed their own brand for the chocolate products they make from their cacao supertrees, and they named it, aptly, “The Solution.” And it’s working.

“The change that we’ve had,” said Silva, “when we go out to market fairs, they recognize us — oh, you’re the Heifer project, oh you’re the chocolate lady! Because of the value add that we’ve made. We’ve had the opportunity to go to market fairs in the capital, in Quito.”

Silva’s co-op has been sending their cacao to a third party to be processed and made into chocolate bars, but now they want to make their own bars. Heifer is helping them get the equipment and training they need to own the processing part, too. “Our vision is to be able to sell the chocolate in the big markets,” she said.

After the hardship of their early marriage in the city and stressful first years in the country, things are finally coming together for Silva and family. “It’s beautiful. Because not everyone has that good fortune. Because they have to go away for work. They have to be separated. But we’re together,” she said.

The couple hopes that their daughters will have a good education, and that they will see the beauty of farm life, too. If you ask Silva what she is most proud of in her life, she will tell you, “*Ser una campesina* [Being a farmer].” ■

KNOW YOUR *Chocolate*

The average person in the U.S. eats about 10 pounds of chocolate a year, and worldwide, the chocolate industry is worth more than $100 billion. Despite its immense popularity, many people don't know the origins of their favorite sweet or how to pick out a high-end chocolate bar that doesn't have a household name like Snickers or M&M's.

WHAT IS THE DIFFERENCE BETWEEN CACAO AND COCOA?

Cacao is the name of the tree native to Latin America. It produces pods that are full of seeds covered in white, fleshy fruit. Inside the pods there are also cacao seeds, or beans, which turn into chocolate once they've been fermented, dried and roasted.

Some people use cocoa and cacao interchangeably, though experts tend to use "cocoa" to describe the beans after they're fermented or the powder created by grinding and pressing fat out of the beans. However, powder that isn't processed as much or is made with unroasted seeds is usually called cacao powder.

WHAT KINDS OF CHOCOLATE ARE OUT THERE?

Dark chocolate contains cacao, sugar, flavorings and an emulsifier, for a smooth consistency. Add milk to that and you've got milk chocolate, whereas white chocolate is made using a base of cocoa butter.

If you ever want to consume chocolate like the Aztecs did, it's not too hard to find Mexican drinking chocolate or unsweetened cacao powder at specialty stores.

WHERE DOES CACAO COME FROM?

Due to the demand for chocolate, cacao trees have spread from the Americas to Africa, Asia and Australia. It generally only grows 20 degrees north or south of the Equator in climates with consistently warm temperatures that have regular – but not excessive – rainfall.

About 90 percent of cacao today comes from West Africa and Latin America, but Southeast Asia is increasingly exporting the crop.

Most large companies buy their chocolate from West Africa, particularly Ivory Coast and Ghana, and Indonesia, whereas craft chocolate more often comes from South America or East Africa (Madagascar or Tanzania) – places that generally produce a more robust flavor profile.

HOW DO I KNOW WHAT KIND OF CHOCOLATE BAR I'M BUYING?

Labels on chocolate bars typically list where the cacao was grown and sometimes the name of the bean type. Most high-end dark chocolate bars also include a percentage showing how much of it comes from the cacao plant.

If the packaging says "75%" that means that three-fourths of the weight of that bar comes from cocoa powder or butter. Generally, the higher the percentage, the less sugar that's been added, making the chocolate taste more bitter.

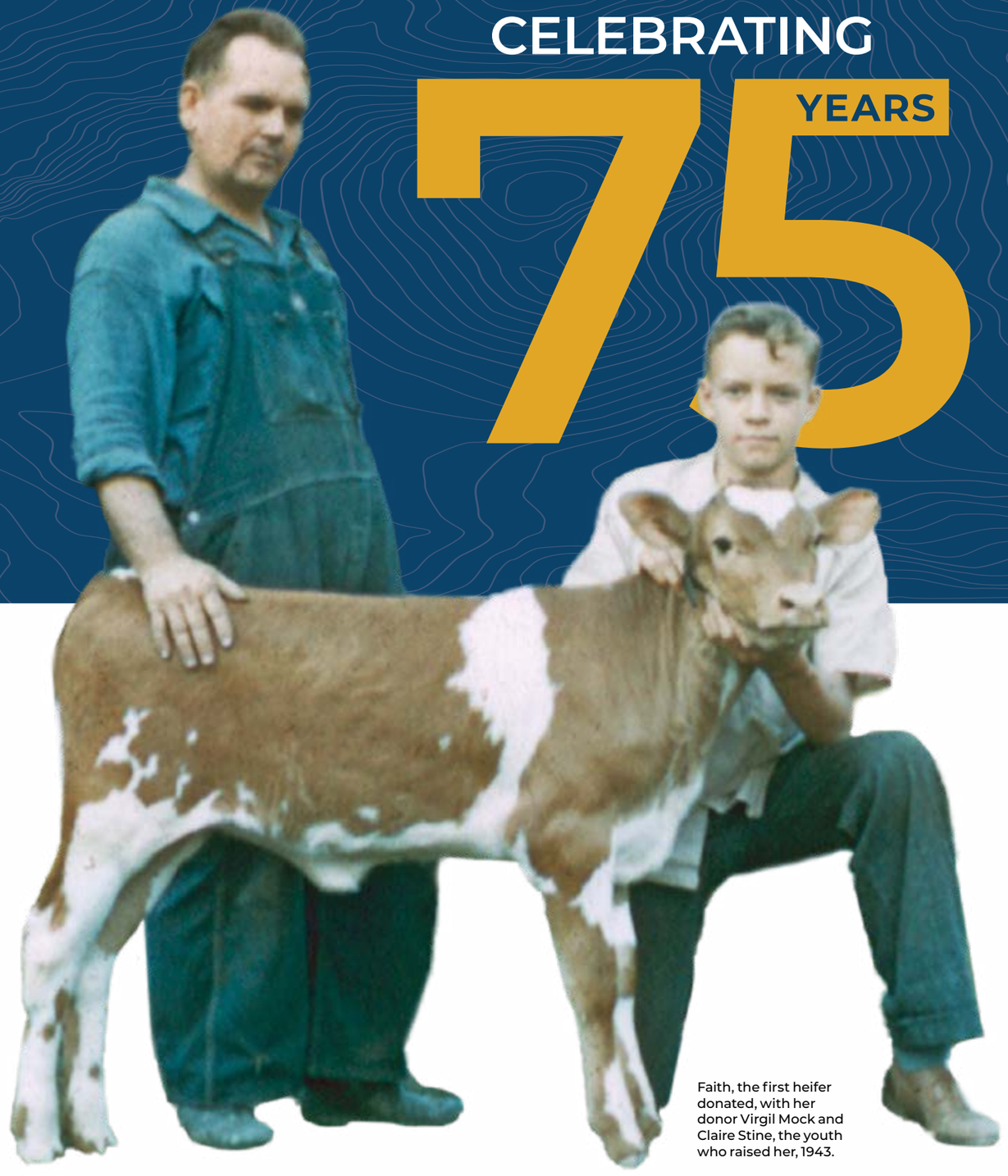
If the chocolate bar says "single origin," that means all of the cacao used to produce it came from one particular region. "Single estate" means all of the beans came from one particular farm.

CELEBRATING

75 YEARS

OF HEIFER INTERNATIONAL

WHERE IT ALL BEGAN



Faith, the first heifer donated, with her donor Virgil Mock and Claire Stine, the youth who raised her, 1943.

IN 1944, DAN WEST STARTED HEIFERS FOR RELIEF, WHICH EVENTUALLY BECAME HEIFER INTERNATIONAL. SOON AFTER, THE FLEDGLING ORGANIZATION STARTED SHIPPING LIVESTOCK FROM THE UNITED STATES TO OTHER COUNTRIES. AS WE CELEBRATE OUR DIAMOND ANNIVERSARY, HISTORIAN PEGGY REIFF MILLER LOOKS BACK AT THE FIRST SHIPMENT AND HOW IT AFFECTED FAMILIES IN CASTAÑER, PUERTO RICO.

BY **PEGGY REIFF MILLER,** *WORLD ARK* CONTRIBUTOR

THE VERY FIRST SHIPMENT of cows from a shoestring team of farmers and pacifists landed in Puerto Rico in July of 1944. And although she was a very small child at the time, Elizabeth Cruz remembers the outsized change those cows delivered to her small mountain town of Castañer.

As a young orphan being raised by her grandmother, Cruz passed part of each day waiting for a cup of fresh milk provided by livestock newly arrived from the mainland United States. At the time, of course, no one realized these were only the first animals donated by a nascent organization that would become Heifer International. Now a retired nurse and board member of the local hospital, Cruz was an honored guest at Heifer International's 75th birthday party held in Castañer in October.

"Today is a very special day for me," Cruz said. "My grandmother used to bring me a little bottle, an empty one, for the milk that the Americanos would bring to us. Tears came down my face remembering those beautiful days."

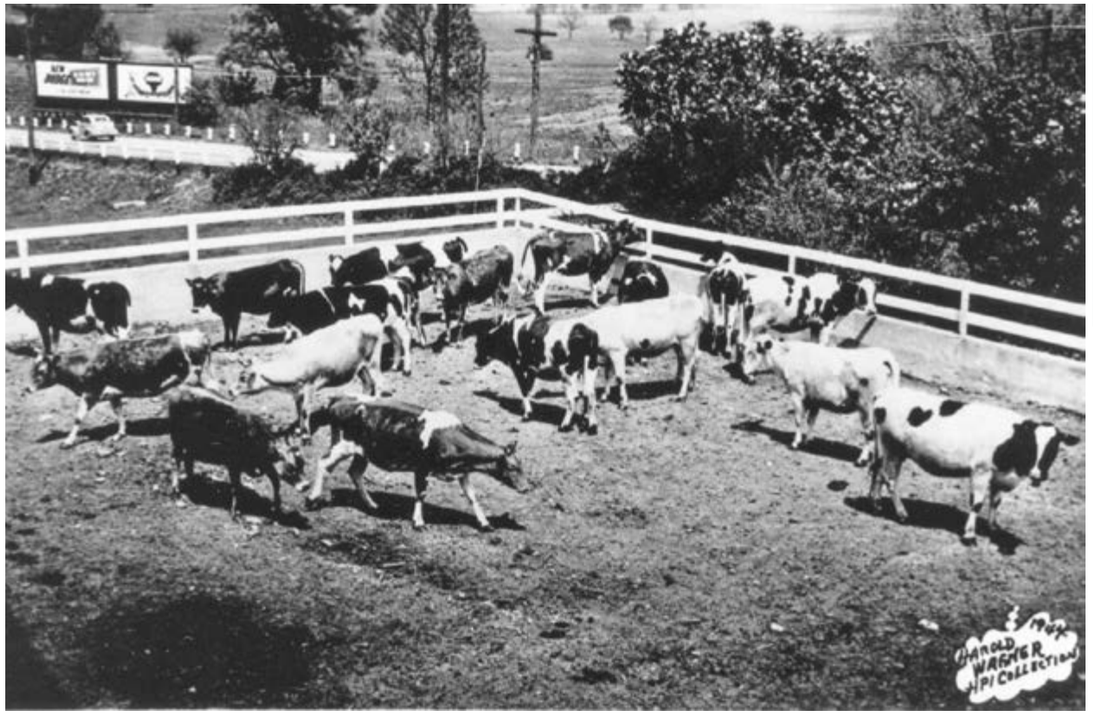
HE DETERMINED THEN AND THERE TO DO SOMETHING ABOUT IT. AND THE IDEA OF THE HEIFER PROJECT, OF SENDING COWS SO PEOPLE DEVASTATED BY WAR COULD FEED THEMSELVES, WAS BORN.

WHY PUERTO RICO?

That first delivery of Heifer cows to Puerto Rico can be traced to two simultaneous historical developments in 1937. One was the creation of Civilian Public Service camps to provide conscientious objectors a way to serve during World War II. The other was the creation of the Heifer Project itself, brainchild of Church of the Brethren leader Dan West.

In 1937, leaders of the historic peace churches – the Brethren, Mennonites and Society of Friends (the Quakers) – began urging President Franklin D. Roosevelt to provide an alternative to military service for young draftees whose religion or personal philosophy prevented them from serving in combat roles. In World War I, there was no alternative. Conscientious objectors had to either find a way to cooperate within the military or be sent to prison. One of those men was Dan West. He served as a conscientious objector in the U.S. Army Quartermaster Corps in South Carolina in 1918, an experience that inspired him to dedicate his life to doing as much for peace as a soldier does for war.

In late 1937, with backing from the Church of the Brethren, West ventured to Spain to work with the Quakers on a relief project in the midst of the Spanish Civil War. There, he witnessed great suffering. Seeing babies and tubercular children dying from a shortage of powdered milk made him think of his own little girl at home. What would he do if he didn't have enough milk for her? He determined then and there to do something about it. And the idea of the Heifer Project, of sending cows so people devastated by war could feed themselves, was born.



By 1941, Civilian Public Service camps became a reality. And when the United States entered World War II that December, the newly created Brethren Service Committee of the Church of the Brethren began planning to help provide some postwar relief by sending cows to Europe.

The Brethren Service Committee also opened a Civilian Public Service camp in Puerto Rico, which had been a U.S. territory since 1898. Campers' first target was Castañer, a town of 40,000 or more people served by only one doctor and a nurse. The unit got to work constructing a hospital.

Stateside, the Heifer Project idea was catching on. Farmers started raising heifers – female cows yet to give birth to their first calf. Others raised money to buy heifers for the project. By 1944, hundreds of animals were ready to ship. With World War II still raging, however, animals could not risk a trip across the submarine-studded Atlantic. Instead, the Brethren Service Committee opted to boost its work in Puerto Rico by sending heifers to the poverty-stricken island.

WITH WORLD WAR II STILL RAGING, ANIMALS COULD NOT RISK A TRIP ACROSS THE SUBMARINE-STUDDED ATLANTIC. INSTEAD, THE BRETHREN SERVICE COMMITTEE OPTED TO BOOST ITS WORK IN PUERTO RICO BY SENDING HEIFERS TO THE POVERTY-STRICKEN ISLAND.

SHIPPING BEGINS

On June 7, 1944, cowboys herded 18 heifers from Midwestern farms at the Nappanee, Indiana, stockyards. After a four-day train ride south and a month's wait in Mobile, Alabama, 17 of those heifers set sail for Puerto Rico on July 14 on the S. S. William D. Bloxham. One got sick and had to stay behind. Another died on the ship after premature birth of her dead calf.

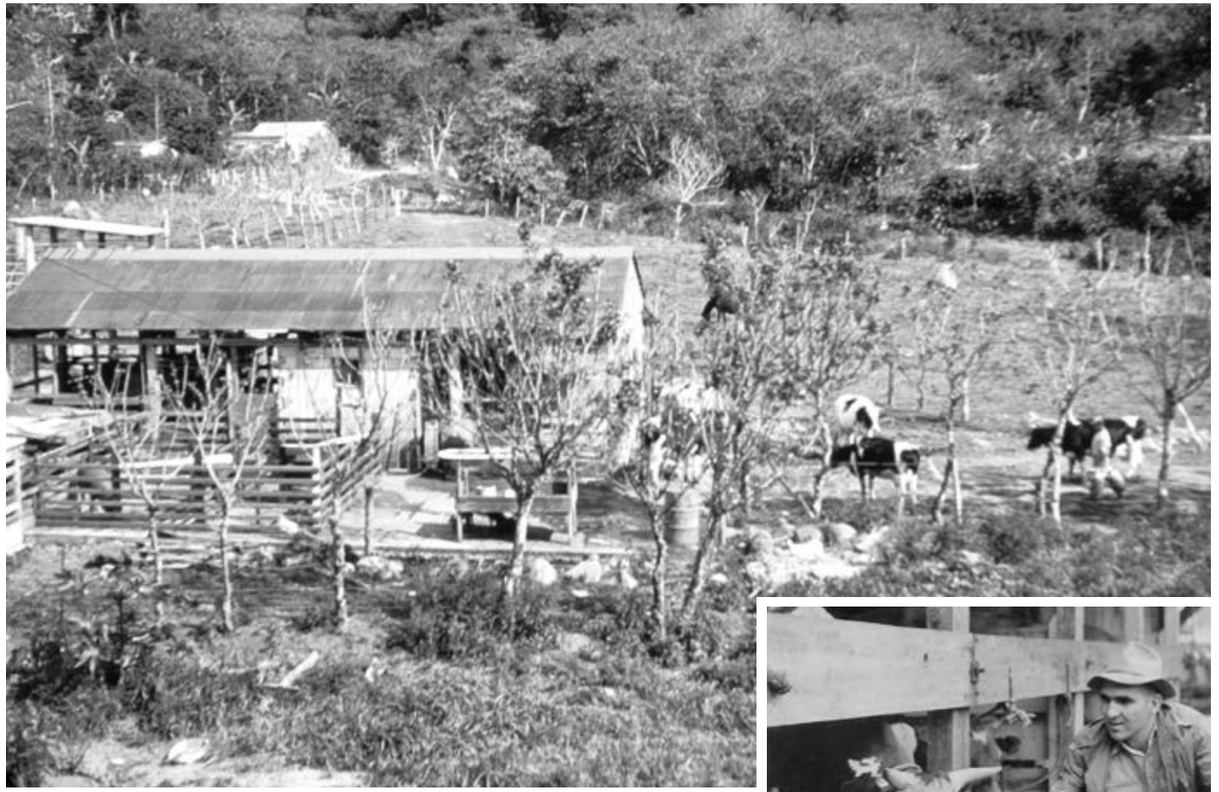
Young Ohio farmer Wayne Hostetler tended the heifers at his own expense. On the eight-day journey, he watered and fed his charges and cleaned their stalls three times a day. With the war still on, the ship stopped at the U.S. Naval base in Guantanamo Bay, Cuba, where it joined a convoy of eight merchant ships with four Navy escorts.

The S. S. William D. Bloxham docked in San Juan, Puerto Rico, at 5 a.m. July 22. By 5:30 p.m., 16 heifers and four new calves were loaded on trucks and headed to their new homes. Each recipient farmer paid the shipping costs of about $75, covered with help from government loans. The deliveries were all well-received, Hostetler wrote in a report for the Church of the Brethren's Heifer Project Committee.

TOP LEFT
Dan West distributing clothing to Spanish Civil War victims, 1937. Photo courtesy of Brethren Historical Library and Archives.

TOP RIGHT
The first 18 heifers collected at the Nappanee, Indiana, stockyards awaiting shipment to Puerto Rico, June 1944. Photo from Heifer Archives.

BOTTOM RIGHT
Director Rufus King and seagoing cowboy Wayne Hostetler with Faith and her calf on her new farm in Medianía, Puerto Rico, July 1944. Photo courtesy of Rufus King family.



“THE HEIFERS WENT TO POOR RESETTLERS WHO OWNED NO DAIRY CATTLE AND COULD PROVIDE PLENTY OF GOOD GRAZING FOR THE HEIFER’S FEED. THE FAMILIES WERE USUALLY LARGE AND VERY GRATEFUL FOR THE GIFT OF HEIFERS.” — Farmer Wayne Hostetler

“The heifers went to poor resettlers who owned no dairy cattle and could provide plenty of good grazing for the heifer’s feed,” Hostetler wrote. “The families were usually large and very grateful for the gift of heifers. For instance, Faith ... is to supply milk for a family of 12 children who have never tasted milk. When we visited some of these homes we noticed that these farmers did almost everything they knew how to make the heifers comfortable. At one home they had the baby calf in their one-room house and carried it to nurse its mother four or five times a day.”

HEIFERS COME TO CASTAÑER

When news of that successful first shipment spread, more families started asking for heifers. And with the ongoing war in Europe still keeping transatlantic trips off the table, the Heifer Project Committee approved another shipment of 50 cattle to Puerto Rico at their meeting March 18, 1945.

Castañer got none of the cows from the first shipment, but was allotted six heifers and one bull from the second one. The Brethren Service Committee hoped the new cows could boost nutrition for people at the local hospital, improve local cattle stock through better breeding and provide opportunities to teach best practices to would-be cattle farmers.

A May 1, 1945, newsletter by the Civilian Public Service camp hints at the excitement that preceded the cows’ arrival: “The Castañer Project will soon be the proud owner of six heifers and one bull. ... The people of the community are very much interested in the expected arrival of the heifers. Not only as a matter of curiosity, but also because many of them would be very happy to be able to secure calves to use as breeding stock. This is especially true as regards the male calves.”

The newsletter also noted that the “Puerto Rico Reconstruction Administration officials have been very cooperative in the matter of preparing housing and feed for these ‘expectant mothers.’ We have received the building materials for remodeling one section of the [Puerto Rico Reconstruction Administration] horse barn into what should be a very satisfactory cow barn and bull pen. With a cement floor, running water, and electric lights, the dairy barn should be quite well equipped.” Crews also planted grass to be cut and chopped daily for the cattle.

Four months after the cows’ arrival in Castañer, local Civilian Public Service camp Director Rufus King issued a glowing report. “The six heifers here in the herd at Castañer have done quite well and have adjusted splendidly. We are getting all of our fresh milk for the unit and for the hospital from this herd, making it possible to eliminate former and less satisfactory sources.”

TOP LEFT
Site of the April 29, 1945, dedication service at the York (PA) Fairgrounds for the 50 heifers sent to Puerto Rico in May of that year. Photo in Heifer Archives.

BOTTOM LEFT
Faith with her calf on her new farm in Mediaría, Puerto Rico, 1944. Photo courtesy of the Wayne Hostetler family.

TOP RIGHT
The barn housing the Castañer heifers, circa 1953. Photo by Dean Kagarise.

BOTTOM RIGHT
Director Rufus King meets the heifers in the second shipment to Puerto Rico on board in San Juan, May 1945. Photo courtesy of Carl Epp.

TOP LEFT
Heifer Board Member and Church of the Brethren Director of Global Mission and Service Jay Wittmeyer with Heifer recipient María Quiles Pérez. A little girl when her family received their heifer, she said the gift made a huge difference.

BOTTOM LEFT
Kathy Díaz presents the Proclamation of the Puerto Rico Senate to Heifer representative Jesús Pizarro and Church of the Brethren Director of Global Mission and Service Jay Wittmeyer.

TOP CENTER
A portion of the Medford Neher mural in Hospital Castañer depicting the hospital's history includes Heifer Project's contribution. Photo by Peggy Reiff Miller.

TOP RIGHT
Mayor Roberto Pagán and Church of the Brethren General Secretary David Steele unveil the historical marker near the location of the barn that housed heifers sent to Castañer, Puerto Rico, in 1945. Photo by Peggy Reiff Miller.

BOTTOM RIGHT
Church of the Brethren General Secretary David Steele gives a bull calf to Castañer high school agricultural student Erick Yadiel Rivera.

"THE MOST IMPORTANT MOMENT IN THE HEIFER PROJECT IS THE PASSING ON THE GIFT, BECAUSE IN THIS MOMENT THE BENEFICIARY BECOMES A DONOR."
— Jesús Pizarro

PASSING IT ON

On October 5, 2019, representatives from Heifer International, Castañer Hospital, the Church of the Brethren in the U.S. and Puerto Rico and Puerto Rican government officials met to celebrate the success of those first shipments to Puerto Rico. A tour of the modern hospital, a project begun by the conscientious objectors from Civilian Public Service camp #43 more than seven decades ago, gave evidence that Castañer has evolved into a thriving, caring community. Local officials also unveiled a roadside marker near the site of the remains of the old hospital and barn that housed the heifers and bull sent to Castañer in 1945.

The celebration culminated with the "passing on the gift" of a bull calf provided by the Church of the Brethren District of Puerto Rico congregations. In the high point of the day, Heifer International Vice President of Financial Innovation Jesús Pizarro and Church of the Brethren General Secretary David Steele presented the calf to local high school agricultural student Erick Yadiel Rivera, whose home was badly damaged by Hurricane Maria.

"The most important moment in the Heifer Project," Pizarro emphasized, "is the passing on the gift, because in this moment the beneficiary becomes a donor." ■

PHOTOS BY PHILLIP DAVIS

Cultivating Fungi Leads to Mushrooming Profits in Uganda

By Jason Woods, *World Ark* editor

DESPITE THE HARD WORK Tonny Musisi put into jobs at a construction site, making wood charcoal and growing maize, he never made enough money to buy a bed, much less a TV or stereo. But after joining the East Africa Youth Inclusion Program, Musisi can afford all those things while also saving for the future.

"For me, my life has changed," said 23-year-old Musisi, who lives in the community of Jinja Kalori, Uganda. "And I've seen other people's lives change."

Uganda is one of the world's youngest countries, with an average age of 15.5 and nearly 80 percent of the population under 30. With such a large number of job seekers in their late teens and early twenties, it can be hard for youth to find work.

"Very few young people have jobs," Musisi said. "People my age, most go into boda-boda [motorcycle taxis]," he said, adding that many others work in manual labor. "Others don't have work to do, they just keep moving around."

The East Africa Youth Inclusion Program, which is a partnership between Heifer International and the Mastercard Foundation, is designed to change that.

The program is helping 25,000 Ugandan and Tanzanian youth, ages 15-24, develop business ideas and find pathways to employment. Participants share their new skills, knowledge and resources with other young people entering the job market. The program also offers apprenticeship, mentorship and vocational programs.

LEFT
Tonny Musisi holds a pot of oyster mushrooms he grew in Jinja Kalori, Uganda.

TOP
Oyster mushrooms grown by Tonny Musisi.

TOP LEFT
Mushrooms, packaged and labeled for sale.

TOP RIGHT
Mushrooms will soon grow on these bags of organic material.

Some project members start dairy or poultry businesses. For Musisi, mushrooms piqued his interest.

"Mushrooms are a very reliable source of income," he said. "Mushrooms are not like green plants that need a lot of sunshine. They don't stop growing. Each day that comes, you have mushrooms." Musisi also prefers growing mushrooms because they don't take much space or time to cultivate. Generally, mushrooms start sprouting in just two or three weeks, he said.

The idea to grow mushrooms came from his aunt, before Musisi joined the project. But after learning technical and financial skills from the project, he felt ready to start his new business. One of the largest obstacles young Ugandans face when trying to start or expand a business is access to credit and financial services. But as a member of the project, Musisi could take out a loan at an affordable rate and begin to establish a credit record. "Many youth have taken those loans and made them into businesses," he said.

Musisi didn't need much money to get off the ground, though. "Another reason I love mushrooms, compared to other businesses, [is that] less capital is needed," he said. To make one garden, Musisi needed around 2,000 shillings ($0.54). "You make 25,000 ($6.75) from this garden in a period of two months. It doesn't require many materials for it to stay here. When I water it, I get mushrooms."

Once started, Musisi excelled as an entrepreneur. He once earned only 250,000 shillings ($68) a month. Now Musisi's mushroom business is thriving, with monthly earnings of up to 2 million shillings ($540).

One of the best perks of the new gig is being his own boss. "I set my schedule," Musisi said. "I wake up in the morning, pack my mushrooms, get my motorcycle and ride to the market. They pay me cash, then I buy the things I need and come back. You find customers waiting for you here." After tending to the mushroom gardens, Musisi has enough time to support other burgeoning fungus farmers and sometimes even get in a little rest.

Part of the training process includes goalsetting and planning for the future. "We had a lot of trainings," Musisi said. "'In five years, how do you see yourself? Draw a house, draw a car, and say, by 2020, I want to be like this.'" Participants also make a goal to commit 20 percent of their earnings to savings.

Musisi has already put back 4.5 million ($1,216) in savings and plans to double that in the near future. He wants to use that money to keep the momentum he created going. "I want to get a piece of land to engage in two more businesses," he said. ■

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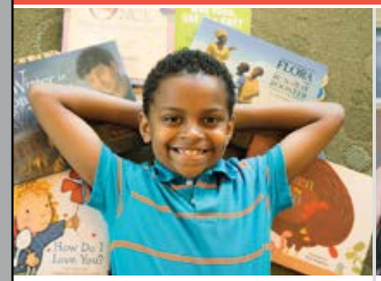

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Eco-Friendly Lawn Alternatives

By Molly Mitchell, *World Ark* writer

We need to talk about our grass habit. Did you know that lawns are the most grown crop in the United States? Not corn. Not soybeans. Grass. What with the world's exploding population, decline in arable land and endangered soil quality, the idea that the most-grown crop is something that doesn't feed anyone — even animals — makes less sense the more you think about it. And yet Americans especially put an enormous amount of money, resources, time and effort into maintaining lawns.

Now, lawns are great in a lot of ways. They are a friendly surface for people and pets to play on. Green spaces are great for mental health, property values and even crime prevention. But there are plenty of ways to achieve these goals other than a traditional swath of Kentucky bluegrass, and it might be time to think outside the lawn. ■

HERE ARE A FEW SUGGESTIONS TO HELP YOU GET STARTED.

NATIVE GRASS

First of all, you don't have to ditch grass entirely to do better for our environment and your wallet. You can do a world of good by simply switching your lawn to a native grass. Kentucky bluegrass has become the standard for lawns, but it's not native to most of the U.S. and is therefore very resource-intensive to take care of. Look into native species for your lawn that are already adapted to your climate and will therefore require less water and maintenance, which means a better time for the environment and more ease for you! Red fescue is a great choice because it's shade- and drought-resistant and holds up well under heavy foot traffic. Sedges are low-maintenance grasses that bunch together, and you can let them grow out as ornamental grass or plant them close and mow them short for a lawn replacement.

GROUNDCOVERS

A groundcover is a plant that, well, covers the ground and isn't grass. If you're not married to a grassy lawn, there are many types of groundcovers to try instead. Of course, it all depends on your climate – choosing species that are native to your climate is key to sustainability and good stewardship of resources.

Clover

For sunny spaces that may not have great soil quality already, explore clover as a good alternative. Clover naturally fixes nitrogen in soil, which means that you won't need to use fertilizer, and, in fact, your soil will grow healthier if you plant it. It is resistant to pet urine stains and encroaching weeds. Red clover and Dutch white clover are both popular choices because they don't need much watering after the initial growing phase, and they don't need fertilizing or even mowing. Plus, they're super affordable and spread quickly.

PHOTO BY I. SÁČEK

Moss

Moss is a great alternative for shady, damp areas. There are loads of different varieties to choose from based on your climate and preference. You can choose one type that will easily spread or choose a mix and create a lot of visual interest in your landscaping. It won't work as a soccer field, but it is a lovely, plush surface for occasional foot traffic or as a filler between pavers. Plus: No mowing! Ever!

AROMATICS

Creeping thyme

As opposed to English thyme, which is the cooking herb we usually think of, varieties of creeping thyme are hardy and aesthetically pleasing groundcovers that can thrive in all kinds of climates and need significantly less water than a grass lawn. It only grows a couple of inches tall, so it needs minimal mowing. Plus, it smells great.

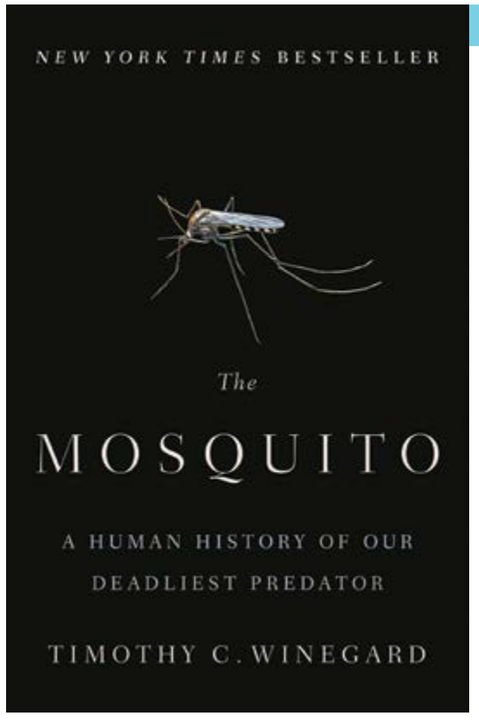
Chamomile

Speaking of great smells, chamomile is another low-maintenance lawn alternative. Roman chamomile is the kind you want for your lawn to get that neat, green lawn aesthetic without all the mowing and edging work! It produces daisy-like white flowers that smell like apples, which you can enjoy in their natural state, pick for some chamomile tea or mow if you're just not that into it. Chamomile is drought-resistant and a good source of nitrogen, so it's great for the soil.

Mint

Wouldn't you love a breath of minty fresh air every time you take a step in your lawn? Consider Corsican mint as a lawn replacement. Mint is a little more finicky than chamomile and especially thyme – it doesn't tolerate a lot of foot traffic, isn't drought-resistant and it needs a mild winter to survive. But if you live in the right climate, it makes for a beautiful, lush green carpet that smells like mojitos. Delicious. Don't be scared by reports of mint running rampant — this creeping variety is pretty well-behaved.

The Mosquito: *A Human History of Our Deadliest Predator* Delivers Swarms of Fascinating Facts



The Mosquito: A Human History of Our Deadliest Predator
By Timothy C. Winegard
Dutton, Hardcover $28
442 pages

By Austin Bailey, *World Ark* editor

Nearly half of all humans who have ever lived were killed by mosquitos and the diseases they spread. That's an estimated 52 billion people killed by an insect that weighs less than 88 millionths of an ounce.

Sounds crazy, right? But it's true. And it's a pretty fantastic premise for a book. Historian Timothy C. Winegard chronicles humankind's ongoing battle against malaria, dengue, yellow fever and other mosquito-borne illnesses with unexpected enthusiasm. He comes on so strong, in fact, that it takes the first 100 pages or so to get on board. Stick with him, though, and you will catch the mosquito bug, too.

The Mosquito: A Human History of Our Deadliest Predator, illuminates how the tiny mosquito sculpted the shape of human history by influencing our diets, remapping explorers' and conquerors' paths and determining the outcomes of monumental battles. This is one of those books that will have you nodding along, saying, "No way! Really?" out loud.

Case in point: While Western medicine didn't pinpoint mosquitos as the source of malaria until 1897, ancient Sumerians were attributing malarial fevers to Nergal, the insect-like Babylonian god of the underworld, by 3200 BCE. And Indian physician Sushruta connected mosquito bites and malarial symptoms in the sixth century BCE. Lack of proof, however, meant his correct hypothesis was not accepted for thousands of years and an unfathomable number of deaths later.

Books that try to cover the entirety of human existence tend toward the dry side, leaving out the gruesome and lascivious details for the sake of expedience. Thankfully, Winegard doesn't bore us in this way. Instead, the author capitalizes on every chance to weave in gross and weird asides that have real sticking power. I probably won't remember which forces suffered the most yellow fever deaths in the Mexican-American War, but it will be hard to forget that ancient Egyptians attempted to soothe malarial fevers by bathing in fresh human urine.

Another pet peeve with some history books is the copious and tedious footnotes I feel obligated to read but am then sorry that I did. Winegard must share this feeling, because his footnotes are delightful. My favorite tags a passage about Lucy, the earliest known human ancestor.

**The famous hominin skeleton Lucy, dating from 3.2 million years ago, acquired her household name from the 1967 song "Lucy in the Sky with Diamonds" by the Beatles, which played loudly on repeat the day she was discovered in the Ethiopian Awash Valley in 1974 by Donald Johanson.*

The book takes on grand themes and vast eras in human history – early Christianity, the Mongol Empire, slavery in the American South, etc. – but keeps it manageable by sticking to a mosquito's eye view. For example, European exploration and colonization of Africa and the Americas would look far different without mosquitos, and Winegard tackles those topics by illustrating how mosquitos both helped and hindered European efforts to take over foreign lands. In the Americas, the malaria and yellow fever Europeans brought with them were catastrophic for native populations who had never been exposed to the diseases and had no acquired immunity. Those who didn't die outright were severely weakened, making the peoples of the Americas easy prey. The scene was reversed in Africa, where few Europeans could survive the mosquito-borne diseases that African populations were somewhat better seasoned to tolerate thanks to genetic protections. This airborne defense largely kept rapacious Europeans away from Africa until Europeans learned to harness the antimalarial power of quinine.

Winegard shows his discipline as a historian and political scientist in the portions of the book about the mosquito's role in determining the winners and losers of wars.

WINEGARD SHOWS HIS DISCIPLINE AS A HISTORIAN AND POLITICAL SCIENTIST TO ITS BEST EFFECT IN THE PORTIONS OF THE BOOK ABOUT THE MOSQUITO'S ROLE IN DETERMINING THE WINNERS AND LOSERS OF WARS.

The Union, for example, got a much-needed leg up with a healthy stockpile of quinine to fend off malaria, while Confederate soldiers were left defenseless by a naval blockade that kept medicine out of reach. Winegard delineates how military masterminds have used mosquitos as weapons for centuries, pushing enemy troops to low-lying, swampy areas where mosquito-vectored sickness was practically guaranteed. This winning strategy was deployed by ancient Romans, Nazis in Italy during World War II and by lots of others in between. Toussaint Louverture, the revolutionary who lead the fight to liberate Haiti from France, was probably the most ruthless and strategic in drafting a mosquito army to his cause. He and his forces lured the French into coastal and low-lying areas, then retreated to the more salubrious hills and simply waited for malaria and yellow fever to kill off the enemy camps. It worked. "In total, of the roughly 65,000 French soldiers sent to Haiti, 55,000 died of mosquito-borne disease," Winegard wrote.

The book is more than 400 pages long, which is tough because no matter how energetic the writing, it's hard to stay super jazzed about mosquitos. The salve comes from the factoids, explainers and aha moments that will almost surely come in handy on some future trivia night. And it's important to stick with it to the end, because the age-old war with mosquitos doesn't appear to be ending soon. More than 830,000 people died of mosquito-borne illness in 2018, and new diseases delivered courtesy of mosquito bite are coming on to the scene. If we take for granted the cost of humankind's bloody, deadly history with mosquitos, we might be condemned to repeat it. ■

"All of my life, I've loved animals. Above all, dogs. This is something that has helped me, going through a harsh period of my life. I was depressed. They brought me out of my depression. This guy's name is Rufo. Rufo has always been a smart dog. He's eaten from the tree of knowledge of good and evil. He knows when I'm sad and when I'm happy."

— Damaris Robles, cacao farmer

PHOTO BY JOE TOBIASON

DAMARIS ROBLES, 32, is part of Heifer's cacao project in Ecuador. In spite of contending with the hardships of poverty and the tragic loss of a child in her past, she is vibrant, gregarious and innovative. She even won a major innovation contest held by Heifer Ecuador for her organic insecticides and fertilizers. Robles takes attentive care of her cacao grove, and Rufo, a gift from her husband, Gualberto García, is always at her heels to help. ■

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